

Atty. Dkt. No. 039153-0484 (G1190)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Lopatin, et al.

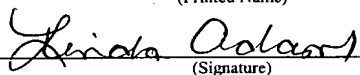
Title: METHOD OF USING AN
ADHESION PRECURSOR
LAYER FOR CHEMICAL
VAPOR DEPOSITION (CVD)
COPPER DEPOSITION

Appl. No.: 10/687,186

Filing Date: 10/16/2003

Examiner: Thanh T. Nguyen

Art Unit: 2813

<p align="center">CERTIFICATE OF MAILING</p> <p>I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date below.</p> <p align="center">Linda Adams (Printed Name)</p> <p align="center"> (Signature)</p> <p align="center">January 18, 2005 (Date of Deposit)</p>
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INFORMATION DISCLOSURE STATEMENT
UNDER 37 CFR §1.56

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Submitted herewith on Form PTO/SB/08 is a listing of documents known to Applicants in order to comply with Applicants' duty of disclosure pursuant to 37 CFR §1.56.

A copy of each non-U.S. patent document and each non-patent document is being submitted to comply with the provisions of 37 CFR §1.97 and §1.98.

The submission of any document herewith, which is not a statutory bar, is not intended as an admission that such document constitutes prior art against the claims of the present application or that such document is considered material to patentability as defined in 37 CFR §1.56(b). Applicants do not waive any rights to take any action which would be appropriate to antedate or otherwise remove as a competent reference any document which is determined to be a *prima facie* art reference against the claims of the present application.

01/25/2005 SFELEKE1 00000038 061447 10687186

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TIMING OF THE DISCLOSURE

The listed documents are being submitted in compliance with 37 CFR §1.97(c), before the mailing date of either a final action under 37 CFR §1.113, a notice of allowance under 37 CFR §1.311, or an action that otherwise closes prosecution in the application.

RELEVANCE OF EACH DOCUMENT

All of the documents are in English.

Applicants respectfully request that any listed document be considered by the Examiner and be made of record in the present application and that an initialed copy of Form PTO/SB/08 be returned in accordance with MPEP §609.

FEE

A fee in connection with submission of an information disclosure statement under 37 CFR §1.97(c) in the amount of \$180.00 in accordance with 37 CFR §1.17(p) is attached.

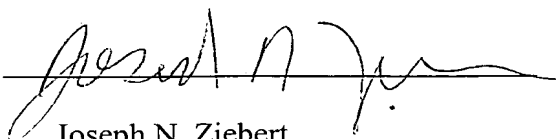
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 CFR §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 06-1447. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 06-1447.

Respectfully submitted,

Date

1-18-05

By



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Attorney for Applicant
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Substitute for form 1449B/PTO

INFORMATION DISCLOSURE
STATEMENT BY APPLICANT

Date Submitted: January 18, 2005

(use as many sheets as necessary)

1 of 3

Complete if Known

Application Number	10/687,186
Filing Date	10/16/2003
First Named Inventor	Sergey D. Lopatin
Group Art Unit	2813
Examiner Name	Thanh T. Nguyen
Attorney Docket Number	039153-0484 (G1190)

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	U.S. Patent Document		Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number	Kind Code ² (if known)			
	A1	2002/0137332	A1	Paranjpe et al.	09-26-2002	
	A2	2002/0109233	A1	Farrar	08-15-2002	
	A3	2002/0102838	A1	Paranjpe et al.	08-01-2002	
	A4	2002/0084529	A1	Dubin et al.	07-04-2002	
	A5	2002/0076925	A1	Marieb et al.	06-20-2002	
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	A7	2002/0039542	A1	Bogel et al.	04-04-2002	
	A8	2002/0036309	A1	Sekiguchi et al.	03-28-2002	
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	A10	6,706,626	B2	Huang	03-16-2004	
	A11	6,703,307	B2	Lopatin et al.	03-09-2004	
	A12	6,605,874	B2	Leu et al.	08-12-2003	
	A13	6,589,874	B2	Andricacos et al.	07-08-2003	
	A14	6,534,865	B1	Lopatin et al.	03-18-2003	
	A15	6,521,532	B1	Cunningham	02-18-2003	
	A16	6,500,749	B1	Liu et al.	12-31-2002	
	A17	6,482,740	B2	Soininen et al.	11-19-2002	
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	A19	6,465,867	B1	Bernard et al.	10-15-2002	
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	A22	6,426,289	B1	Farrar	07-30-2002	
	A23	6,423,633	B1	Tseng	07-23-2002	
	A24	6,423,289	B1	Klatte	07-23-2002	
	A25	6,420,262	B1	Farrar	07-16-2002	
	A26	6,410,383	B1	Ma	06-25-2002	
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	A28	6,365,502	B1	Paranjpe et al.	04-02-2002	
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	A33	6,268,291	B1	Andricacos et al.	07-31-2001	
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	A35	6,225,221	B1	Ho et al.	05-01-2001	
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	A37	6,156,638		Agarwal et al.	12-05-2000	
	A38	6,130,156		Havemann et al.	10-10-2000	
	A39	6,117,770		Pramanick et al.	09-12-2000	
	A40	6,096,648		Lopatin et al.	08-01-2000	
	A41	6,090,710		Andricacos et al.	07-18-2000	

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Examiner
SignatureDate
Considered

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

¹ Unique citation designation number. ² See attached Kinds of U.S. Patent Documents. ³ Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). ⁴ For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

⁵ Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. ⁶ Applicant is to place a check mark here if English language Translation is attached.

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Substitute for form 1449B/PTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT Date Submitted: January 18, 2005 <i>(use as many sheets as necessary)</i>				Complete if Known	
				Application Number	10/687,186
				Filing Date	10/16/2003
				First Named Inventor	Sergey D. Lopatin
				Group Art Unit	2813
				Examiner Name	Thanh T. Nguyen
Sheet	2	of	3	Attorney Docket Number	039153-0484 (G1190)

U.S. PATENT DOCUMENTS					
		U.S. Patent Document			
	A42	6,090,701		Hasunuma et al.	07-18-2000
	A43	6,069,068		Rathore et al.	05-30-2000
	A44	6,037,001		Kaloyeros et al.	03-14-2000
	A45	6,030,895		Joshi et al.	02-29-2000
	A46	6,015,749		Liu et al.	01-18-2000
	A47	5,969,422		Ting et al.	10-19-1999
	A48	5,899,740		Kwon	05-04-1999
	A49	5,882,738		Blish II et al.	03-16-1999
	A50	5,821,168		Jain	10-13-1998
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	A52	5,654,245		Allen	08-05-1997
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	A55	5,243,222		Harper et al.	09-07-1993
	A56	5,224,520		Shinbara et al.	07-06-1993
	A57	5,004,520		Tsuji et al.	04-02-1991

FOREIGN PATENT DOCUMENTS								
Examiner Initials*	Cite No. ¹	Foreign Patent Document			Name of Patentee or Applicant of Cited Documents	Date of Publication of Cited Document MM-DD-YYYY	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T ⁶
		Office ³	Number ⁴	Kind Code ⁵ (if known)				
	A58	EP	1 094 515	A2		04-25-2001		
	A59	EP	1 039 531	A2		09-27-2000		
	A60	EP	1 039 531	A3		12-20-2000		
	A61	EP	0 567 867	A2		11-03-1993		

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
	A62	4.7.3 General Reliability Issues Associated with IC Interconnects; Silicon Processing for the VLSI Era; Vol. II, pp. 264-265.	
	A63	James A. Cunningham, "Improving Copper Interconnects: A Search for Useful Dopants," Semiconductor International, (April, 2000), pp. 1-8.	

001.1762128.1

Examiner Signature	Date Considered
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Sheet	3	of	3

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T ⁶
	A64	Dong Joon Kim et al, "New Method to Prepare W-B ⁺ -N Ternary Barrier to Cu diffusion by Implanting BF ₂ ⁺ Ions Into W-N Thin Film," J. Vac. Sci. Technol. B 17(4), July/Aug, 1999, pp. 1598-1601.	
	A65	W. F. McArthur et al., "Structural and Electrical Characterization of Si-Implanted Tin as a Diffusion Barrier for Cu Metallization," Mat. Res. Soc. Symp. Proc. Vol. 391, 1995, pp. 327-332.	
	A66	PCT International Search Report, International Application No. PCT/US 02/32605, International Filing Date 11/10/2002 (7 pages).	
	A67	PCT International search Report, International Application No. PCT/US 02/32554, International Filing Date 11/10/2002 (5 pages).	

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